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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/287,579	04/06/1999	LE LI	REVEO-9999	6469

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EXAMINER	
QI, ZHI QIANG	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 10/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/287,579	LI ET AL.	
	Examiner	Art Unit	
	Mike Qi	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 September 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *41-67 and 83-89* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *41-67 and 83-89* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 41 and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 6,172,720 (Khan et al),US 6,049,336 (Hakemi et al) and US 4,131,581 (Coker).

Claims 41 and 83, McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) that the liquid crystal sunroof (10) includes two transparent surfaces (22,24) and liquid crystal material (26) therebetween, and the circuit (25) is connected by electrical leads (21,23) to electrodes (30,32) positioned on opposite sides or surfaces of the liquid crystal material (26), and operationally, with switch (29) open or close to control the field-off state or field-on state of the light transmissive characteristics of the sunroof (10) or window (100) of the liquid crystal (26), and generally, when the liquid crystal material is in the field-on state the light should be transmission, and when the liquid crystal material is in the field-off state the light should be scattering, and that the sunroof or window are glazing panel.

McLaughlin does not expressly disclose the liquid crystal material comprises a PSCT liquid crystal material including a non-reactive blend of chiral liquid crystal and a monomer, and the monomer laking the mesogenic group of the general formula: $[Si(CH_3)O]_n$.

However, McLaughlin indicates (col.8, line 64 - col.9, line 29) that regardless of what the liquid crystal material is made, it should provide such operative function. Khan discloses (col.1, lines 17-61) that the stabilized cholesteric liquid crystals have high viscosity which can undesirably increase the response time of these materials when used in electrooptic devices, and exhibits no liquid crystalline phase (i.e., using a polymer which does not have the mesogenic group, i.e., the polymer does not have the liquid crystalline phase) will substantially lower the viscosity of the liquid crystal material, so as to improve the properties such as higher contrast ratio, shorter response time and lower voltages requirement. Khan also discloses (col.1, lines 23-43; col.7, 25-43; col.4, lines 44-60) that in general, the liquid crystal material comprises a chiral material, and the material of chiral nematic liquid crystal greatly reduced the viscosity.

Although Khan does not indicate the monomer laking the mesogenic group of the general formula is $[Si(CH_3)O]_n$, but the function of laking the mesogenic group is suggested by Khan for achieving the lower viscosity so as to improve the properties such as higher contrast ratio, shorter response time and lower voltages requirement, and such material, for example, one identified monomer commercial available from Aldrich is Ethylene Glycol Dimethacrylate (EGD) with a chemical structure of $[Si(CH_3)O]_n$, and the material is not new and already exists in the market.

Further, Hakemi discloses (col.1, line 26 - col.2, line 12) that using Polymer Stabilized Cholesteric Texture (PSCT) such liquid crystal material having advantages:(1) haze-free normal-mode and reverse-mode shutters; (2) simplicity of fabrication by eliminating the polarizers and dyes; (3) low voltage requirement; and (4) bistability, and as the concentration of polymer gel is low, there will be no index mismatching and the shutter in the On-state is transparent in all viewing direction (haze-free), and there will be no index mismatching and the shutter in the Off-state is transparent in all viewing direction (haze-free).

Further, Coker discloses (col.6, line 35 - col.7, line 13) that for the purpose of viscosity reducing diluent, a primary requirement is that such diluents be relatively non-reactive in the blends. Therefore, using non-reactive blend of chiral liquid crystal is a primary requirement to reduce the viscosity so as to improve the response time shorter and fast.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a polymer lacking the mesogenic group as claimed in claims 41 and 83 for achieving haze-free, shorter response time and wide viewing angle.

3. Claims 46, 51, 84 and 85 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 4,961,532 (Tangney),US 6,172,720 (Khan et al) and US 4,131,581 (Coker).

Claims 46, 51, 84 and 85, McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) an electro-optical glazing panel as the explanation above except for

the liquid crystal material comprising a non-reactive blend of a chiral liquid crystal and Ethylene Glycol Dimethacrylate.

However, Tangney discloses (col.3, lines 52-53) that the Ethylene Glycol Dimethacrylate is a typical monomer, and that was common and known in the art as using a monomer material such as Ethylene Glycol Dimethacrylate or combinations to make a liquid crystal material. Such material (for example, commercial available from Aldrich) already exists in market, and anyone skilled in the art can use such known material. Khan discloses (col.1, lines 23-43; col.7, 25-43; col.4, lines 44-60) that in general, the liquid crystal material comprises a chiral material, and the material of chiral nematic liquid crystal greatly reduced the viscosity.

The reference Tangney discloses a monomer material and that is an evidence to show using Ethylene Glycol Dimethacrylate as a monomer is common and known in the art.

Further, Coker discloses (col.6, line 35 - col.7, line 13) that for the purpose of viscosity reducing diluent, a primary requirement is that such diluents be relatively non-reactive in the blends. Therefore, using non-reactive blend of chiral liquid crystal is a primary requirement to reduce the viscosity so as to improve the response time shorter and fast.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use such known material as claimed in claims 46, 51, 84 and 85 to make the liquid crystal material for achieving haze-free, shorter response time and wide viewing angle

4. Claims 56, 61, 86 and 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 6,049,366 (Hakemi et al), US 4,097,130 (Cole, Jr) and US 6,172,720 (Khan et al).

Claims 56 and 86, McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) an electro-optical glazing panel as the explanation above except for the liquid crystal material comprising a PSCT liquid crystal material including a chiral liquid crystal, a monomer and a dichroic dye.

However, Hakemi discloses (col.1, lines 26-63) that using PSCT (polymer stabilized cholesteric texture) has advantages: (1) haze-free normal-mode and reverse-mode shutters (compared to PDLC); (2) simplicity of fabrication by eliminating the polarizers and dyes (compares to LCD); (3) low voltage requirement (compared to PDLC); and (4) bistability (compared to LCD and PDLC), and as the concentration of polymer gel is low, there will be no index mismatching and the shutter in the On-state is transparent in all viewing direction (haze-free).

Cole, Jr discloses (in abstract) that a dichroic dye for absorbing an additional wavelength (color) of visible light can be selectively actuatable, so that different combination of visible light wavelengths are absorbed to change the color of light transmitted through the display. Therefore, using dichroic dye, the different combinations of visible light wavelengths are absorbed to achieve a color change of light transmitted through the display.

Khan discloses (col.1, lines 23-43; col.7, 25-43; col.4, lines 44-60) that in general, the liquid crystal material comprises a chiral material, and the material of chiral nematic liquid crystal greatly reduced the viscosity.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use PSCT liquid crystal material and a dichroic dye as claimed in claim 56 and 86 for achieving haze-free and a color change of light transmitted through the display.

Claims 61 and 87, the material of the dichroic dye such as anthraquinone dyes can be identified and commercial available from EMI, for example D5, D35, D52 which already exists in market and anyone skilled in the art can use such material as the dichroic dye as the property of the material, and that would have been at least obvious.

5. Claims 62 and 88 are rejected under U.S.C. 103(a) as being unpatentable over US 4,749,261 (McLaughlin et al) in view of US 4,579,422 (Simoni et al),US 6,172,720 (Khan et al),US 4,131,581 (Coker) and US 6,171,663 (Hanada et al).

Claims 62 and 88, McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) an electro-optical glazing panel as the explanation above except for the liquid crystal material comprising a non-reactive blend of a chiral liquid crystal, a monomer and a surfactant.

However, Simoni discloses (col.3, lines 4549; Fig.2) that in order to obtain a good planar orientation of the cholesteric mixture (1), the glass plates (2,2') were repeatedly immersed in a

1% solution of a polymer surfactant. Such that the liquid crystal material comprising a surfactant so as to obtain a good planar orientation of the cholesteric mixture.

Although the use of a surfactant in Simoni is for the purpose of facilitating the rubbing step, but according to the property of a surfactant to obtain a good planar that means the panel planar (uniformity) also can be enhanced.

Further, Hanada discloses (col.17, lines 34-44) that in order to improve the surface smoothness of a layer, various additives such as organic surfactant is used.

Khan discloses (col.1, lines 23-43; col.7, 25-43; col.4, lines 44-60) that in general, the liquid crystal material comprises a chiral material, and the material of chiral nematic liquid crystal greatly reduced the viscosity. Khan also indicates (col.9, lines 43-54) that a monomer can be used as viscosity lowering additive so as to increase the response speed.

Further, Coker discloses (col.6, line 35 - col.7, line 13) that for the purpose of viscosity reducing diluent, a primary requirement is that such diluents be relatively non-reactive in the blends. Therefore, using non-reactive blend of chiral liquid crystal is a primary requirement to reduce the viscosity so as to improve the response time shorter and fast.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use surfactant as claimed in claims 62 and 88 for achieving a good planar of the material, enhancing the surface treatment and improving the smoothness of the layer.

6. Claims 67 and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLaughlin, Simoni and Khan as applied to claims 62 and 88 above, and further in view of US 6,022,547 (Herb et al) .

Claims 67 and 89, Herb discloses (col.20, lines 29-41) that the material of dimethylsiloxane polymer is used as a surfactant. Even though Herb discloses water-in-oil-in-water emulsion, but Herb indicates that the material of dimethylsiloxane polymer is used as a surfactant. Using Poly (Dimethylsiloxane) as a surfactant was common and known in the art, and that would have been at least obvious. The reference Herb is an evidence to show using Poly (Dimethylsiloxane) as a surfactant.

7. Claims 42-44, 47-49, 52-54, 57-59, 63-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLaughlin and Khan, Tangney, Hakemi, Cole, Jr, Coker, Hanada and Simoni as applied to claims 41, 46, 51, 56 and 62 above, and further in view of US 5,691,795 (Doane et al).

Claims 42-43, 47-48, 52-53, 57-58, 63-64, Doane discloses (col. 6, line 64- col.10, line 60, and in Figs 1-3) that the polymer-liquid crystal material (electro-optical glazing structure) is light scattering (total-scattering mode) in a field-OFF condition and optical clear (total-transmission mode) in a field-ON condition. An AC voltage source (17) controls the polymer domains in order to switch the cell between different optical states, and it does not need to use any energy absorbing mechanisms (do not require polarizers which limit the brightness and without the need of color filters which also reduce brightness), such that the operation mode can

be electrically-activated or switched, i.e., in the field-OFF condition the material is strongly light scattering (total-scattering), and when the fields turned on the material is optically clear (total-transmission), and the wavelengths are in the ultra violet (UV portion), and the cell is haze free at all viewing angles.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to operate in the scattering mode and transmission mode as claimed in the claims 42-43, 47-48, 52-53, 57-58, 63-64 for achieving haze free at all viewing angles used as an optical glazing panel.

Claims 44, 49, 54, 59, 65, Doane discloses (col.3, line 66-col.4, line 18) that the wavelength of the light reflected by the material is given by the relation $\lambda=np$ (n is the average reflective index, p is the pitch length), and the wavelength is above infra-red and below ultra-violet, i.e. a broad band electromagnetic spectrum of operation including the UV light, infra-red or visible light, and that was common and known in the art to tailor the band to the required application, and therefore it would have been obvious in the device of Doane to employ a wide band including near-IR, visible and near-UV in order to tailor the operation to the band required for any given application.

8. Claims 45, 50, 55, 60, 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLaughlin and Khan, Tangney, Hakemi, Cole, Jr, Coker, and Simoni as applied to claims 41, 46, 51, 56 and 62 above, further in view of US 5,667,897 (Hashemi et al).

Claims 45, 50, 55, 66, Hashemi discloses (col.1, lines 49-51) that float-glass processing is the conventional way of producing sheet glass, used for automotive and architectural uses, throughout the world.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use float-glass substrates as claimed in claims 45, 50, 55, 60, 66 for producing sheet glass.

Response to Arguments

9. Applicant's arguments filed on Sep. 3, 2003 have been fully considered but they are not persuasive.

Applicant's **only** arguments are as follows:

1) There is no suggestion or motivation for the limitation of claims 41, 46, 51, and 83-85 in the references, such as using PSCT material and including a non-reactive bled of chiral liquid crystal and monomer laking the mesogenic group of $[Si(CH_3)O]_n$.

2) There is no suggestion or motivation for the limitation of claims 56, 61, and 86-87 in the references, such as using PSCT material and including a chiral liquid crystal and monomer and a dichroic dye.

3) The reference Simoni discloses the use of a surfactant is for the purpose of facilitating the mechanical rubbing step in a polarizer that is not used for enhancing panel uniformity of this invention.

4) There is no suggestion or motivation for the limitation of claims 67 and 89 in the references, such as the surfactant comprises Poly(Dimethylsiloxane).

Examiner's response to Applicant's **only** arguments are as follows:

1) McLaughlin discloses (col.4, lines 44-47; col.5, lines 28-47; col.8, lines 14-19; Figs. 2-3) that the liquid crystal sunroof (10) includes two transparent surfaces (22,24) and liquid crystal material (26) therebetween, and the circuit (25) is connected by electrical leads (21,23) to electrodes (30,32) positioned on opposite sides or surfaces of the liquid crystal material (26), and operationally, with switch (29) open or close to control the field-off state or field-on state of the light transmissive characteristics of the sunroof (10) or window (100) of the liquid crystal (26), and generally, when the liquid crystal material is in the field-on state the light should be transmission, and when the liquid crystal material is in the field-off state the light should be scattering, and that the sunroof or window are glazing panel. McLaughlin indicates (col.8, line 64 - col.9, line 29) that regardless of what the liquid crystal material is made, it should provide such operative function.

Hakemi discloses (col.1, line 26 - col.2, line 12) that using Polymer Stabilized Cholesteric Texture (PSCT) such liquid crystal material having advantages:(1) haze-free normal-mode and reverse-mode shutters; (2) simplicity of fabrication by eliminating the polarizers and dyes; (3) low voltage requirement; and (4) bistability, and as the concentration of polymer gel is low, there will be no index mismatching and the shutter in the On-state is transparent in all

viewing direction (haze-free), and there will be no index mismatching and the shutter in the Off-state is transparent in all viewing direction (haze-free).

Coker discloses (col.6, line 35 - col.7, line 13) that for the purpose of viscosity reducing diluent, a primary requirement is that such diluents be relatively non-reactive in the blends. Therefore, using non-reactive blend of chiral liquid crystal is a primary requirement to reduce the viscosity so as to improve the response time shorter and fast.

Although Khan does not indicate the monomer laking the mesogenic group of the general formula is $[Si(CH_3)O]_n$, but the function of laking the mesogenic group is suggested by Khan for achieving the lower viscosity so as to improve the properties such as higher contrast ratio, shorter response time and lower voltages requirement, and such material, for example, one identified monomer and commercial available from Aldrich is Ethylene Glycol Dimethacrylate (EGD) with a chemical structure of $[Si(CH_3)O]_n$, and the material is not new and already exists in the market.

2) Hakemi discloses (col.1, lines 26-63) that using PSCT (polymer stabilized cholesteric texture) has advantages: (1) haze-free normal-mode and reverse-mode shutters (compared to PDLC); (2) simplicity of fabrication by eliminating the polarizers and dyes (compares to LCD); (3) low voltage requirement (compared to PDLC); and (4) bistability (compared to LCD and PDLC), and as the concentration of polymer gel is low, there will be no index mismatching and the shutter in the On-state is transparent in all viewing direction (haze-free).

Cole, Jr discloses (in abstract) that a dichroic dye for absorbing an additional wavelength (color) of visible light can be selectively actuatable, so that different combination of visible light wavelengths are absorbed to change the color of light transmitted through the display. Therefore, using dichroic dye, the different combinations of visible light wavelengths are absorbed to achieve a color change of light transmitted through the display.

Khan discloses (col.1, lines 23-43; col.7, 25-43; col.4, lines 44-60) that in general, the liquid crystal material comprises a chiral material, and the material of chiral nematic liquid crystal greatly reduced the viscosity.

The material of the dichroic dye such as anthraquinone dyes can be identified and commercial available from EMI, for example D5, D35, D52 which already exists in market and anyone skilled in the art can use such material as the dichroic dye as the property of the material, and that would have been at least obvious.

3) Although the use of a surfactant in Simoni is for the purpose of facilitating the rubbing step, but according to the property of a surfactant to obtain a good planar that means the panel planar (uniformity) also can be enhanced.

Further, Hanada discloses (col.17, lines 34-44) that in order to improve the surface smoothness of a layer, various additives such as organic surfactant is used. The layers form the panel, so that the layer surface smoothness causing the panel uniformity.

Therefore, it would have been obvious to hose skilled in the art at the time the invention was made to use surfactant for improving the smoothness of a layer.

4) Although the use of a surfactant in the reference Simoni is for the purpose of facilitating the rubbing step, but according to the property of a surfactant to obtain a good planar that means the panel planar (uniformity) also can be enhanced. Herb discloses (col.20, lines 29-41) that the material of dimethylsiloxane polymer is used as a surfactant. Even though Herb discloses water-in-oil-in-water emulsion, but Herb indicates that the material of dimethylsiloxane polymer is used as a surfactant. Using Poly (Dimethylsiloxane) as a surfactant was common and known in the art, and that would have been at least obvious. The reference Herb is an evidence to show using Poly (Dimethylsiloxane) as a surfactant.

Conclusion

10. however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703)308-6213 .

Mike Qi
September 29, 2003

ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800